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SPC Log No. 82-3563

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## **TECHNICAL SUPPORT FOR THE TANK BREAKER PROGRAM**

### **Final Technical Report**

October 1982

James Meni

#### **Sponsored by**

**Defense Advanced Research Projects Agency (DoD)**

**ARPA Order No. 4115**

**Under Contract No. NDA903-81-C-0064 issued by  
Department of Army, Defense Supply Service-Washington  
Washington, D.C. 20310**

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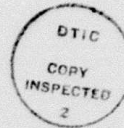
ARPA Order Number	4115
Name of Contractor	System Planning Corporation
Effective Date of Contract	1 November 1981 (Mod to basic contract)
Contract Expiration Date	31 October 1982
Reporting Period	1 Nov 81 - 31 Oct 82
Contract Number	MDA903-81-C-0064
Principal Investigator and Phone Number	T. G. Covington (703) 841-2900
Short Title of Work	Tank Breaker Program

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UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
	AD-A122234	
4. TITLE (and Subtitle)		5. TYPE OF REPORT & PERIOD COVERED
TECHNICAL SUPPORT FOR THE TANK BREAKER PROGRAM		Final Report 1 Nov 81 - 31 Oct 82
		6. PERFORMING ORG. REPORT NUMBER
		82-3563
7. AUTHOR(s)		8. CONTRACT OR GRANT NUMBER(s)
James Meni		MDA903-82-C-0064
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
System Planning Corporation 1500 Wilson Boulevard Arlington, Virginia 22209		ARPA Order Number 4115
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE
Defense Advanced Research Projects Agency 1400 Wilson Boulevard Arlington, Virginia 22209		October 1982
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		13. NUMBER OF PAGES
Defense Supply Service - Washington Room 1D245, The Pentagon Washington, D.C. 20310		4
		15. SECURITY CLASS. (of this report)
		UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
		N/A
16. DISTRIBUTION STATEMENT (of this Report)		
APPROVED FOR PUBLIC RELEASE DISTRIBUTION UNLIMITED		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)		
fire-and-forget missile staring focal plane array seeker guidance and control antitank missile		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)		
- (U) - This report summarizes work performed in support of the Tank Breaker Program for the Defense Advanced Research Projects Agency, Tactical Technology Office (DARPA/TTO), under contract MDA903-81-C-0064, for the period of November 1981 through October 1982.		



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## TECHNICAL SUPPORT FOR THE TANK BREAKER PROGRAM

### A. PURPOSE

This report summarizes the work performed by System Planning Corporation (SPC) for the Defense Advanced Research Projects Agency, Tactical Technology Office (DARPA/TTO), under contract MDA903-81-C-0064, issued by Department of the Army, Defense Supply Service-Washington, from 1 November 1981 through 31 October 1982. A series of tasks was performed for the Tank Breaker Program Manager (PM). This document addresses those efforts.

### B. BACKGROUND AND SCOPE

The Tank Breaker antitank missile concept was developed in FY 79. This fire-and-forget, manportable missile system is based on a staring focal plane array seeker and employs advanced guidance and control concepts that result in impacts against the top armor of tanks. This missile is also effective against other battlefield targets, such as bunkers, and offers high operational flexibility.

The potential operational utility and technical feasibility of Tank Breaker were established after extensive exposure to the user community and to industry. This led to the initiation of a joint DARPA/Army Missile Command (MICOM) program in FY 80. The program has two phases. Phase I, a 1-year effort, consists of demonstrations of critical technologies and development of detailed designs. Phase II is a seeker effort that culminates in captive flight test demonstrations. Under this contract, SPC has supported the DARPA PM in the areas of program analyses, warhead evaluations, and cost analyses during implementation of the Phase I hardware efforts and the Phase II seeker efforts.

## C. SUMMARY

The major efforts that SPC performed during this contract are summarized below.

### 1. Program Analyses

This task provided a broad range of quick-response project analysis support in (1) monitoring performance of the Phase II contractors (Hughes Aircraft and Texas Instruments); (2) tracking cost expenditures of the hardware programs; (3) coordinating hardware component tests with Government laboratories (MICOM and Night Vision and Electro-Optical Laboratory (NVEOL)); (4) assessing program risks; and (5) evaluating progress of technology. Recommendations for program changes were made to the DARPA PM.

A Quarterly Program Review was held at MICOM on 29 March 1982, during which Texas Instruments and Hughes Aircraft presented their revised program plans that reflected the reduced funding. In addition, hardware and software developments were reviewed. SPC participated in this review, and recommendations were delivered to LTC J. Acklin.

SPC participated in the Phase II Program Review held at DARPA. The Tank Breaker hardware contractors, Hughes Aircraft and Texas Instruments, presented plans for modifying their respective programs to meet budget constraints imposed by Congress. SPC assisted the DARPA PM in the assessments of the proposed programs.

A Quarterly Program Review was held at the contractors' facilities on 20 and 22 September 1982. SPC participated in the review and recommendations were delivered to LTC J. Acklin.

SPC assisted the International Defense Review in the preparation of an article on Tank Breaker to be published in that journal. In addition to providing source materials, SPC reviewed the draft and changes were recommended.

A new task was added to evaluate the capabilities of the Rattler candidate to perform general purpose assault missions and limited air defense against attacking helicopters and fixed-wing aircraft. The task was completed, and SPC Annotated Briefing Report 806, Rattler Secondary Mission Assessment, was published and distributed in April 1982.

A paper on Tank Breaker was prepared and briefed at the Army Night Operations Symposium, held at El Toro, California. An unclassified version of the paper was also briefed, at the request of LTC J. Acklin, at Technical Marketing Society of America seminars held at London, United Kingdom, and Munich, West Germany. The concept also was briefed to the Defence Ministry at the United Kingdom Embassy.

Briefing materials were updated to reflect Phase I results and Phase II progress.

## 2. System Effectiveness

The lethalties of Tank Breaker and laser beam rider (LBR) missiles were examined. Based on parametric lethality estimates performed by the Army Ballistic Research Laboratory and weight estimates from MICOM, the effectiveness of Tank Breaker and LBR missiles against T-72, T-80, and T-80 follow-on targets were estimated. The results were briefed to the Rattler Program Management Office, to the Department of the Army Staff, and to the Tank Breaker hardware contractors. A briefing report, Rattler Lethality Comparisons, was published in April 1982.

## 3. Seeker Applications

Potential applications of the Tank Breaker seeker technology were examined. Several were identified, including ground-launched lock-on-before-launch and lock-on-after-launch; helicopter-launched antiarmor, air defense suppression, and anti-air and ground-to-air applications.

## 4. Cost Analyses

A comparison of development risks and production costs of Tank Breaker and LBRs was completed. The results were briefed to the Department of Army Staff.

The feasibility of adding a fiber-optic data link and reusable electronics to the Tank Breaker missile was examined. It is estimated that the cost of the data link, including the interface electronics, would be approximately \$2,000 per missile (\$1,200 for the fiber-optic spool and \$800 for electronics). The weight penalty would be approximately 3 lb, and the



increase in length approximately 6 inches. Based on these costs, it is unlikely that missile costs can be reduced, especially if very high-speed integrated circuits technology is employed by Tank Breaker.

5. Human Factors

The relative effectiveness of Tank Breaker and other IMAAWS/Rattler candidates against tank targets was estimated using Tactical Effectiveness Testing of Antitank Missiles (TETAM) data and Human Engineering Laboratory (HEL) test results. The desired system range capabilities and the values of elevated trajectories, fire-and-forget, and low signature launch were quantified. The results were briefed to the DARPA PM and to Army agencies.

6. Test Activities

SPC assisted in formulating the Phase II test plan. SPC staff members attended test planning meetings and presented independent assessments to the DARPA PM. These activities were performed on a quick-response basis to facilitate the contractor schedule.